MONTANA DIABETES SURVEILLANCE & CLINICAL COMMUNICATION

MONTANA DIABETES PROJECT

Montana Department of Public Health and Human Services
Chronic Disease Prevention and Health Promotion Program
Room C317, Cogswell Building
PO Box 202951
Helena, Montana 59620-2951

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INCREASING RATE OF DIABETES IN PREGNANCY AMONG AMERICAN INDIAN AND WHITE MOTHERS IN MONTANA, 1989-2000

WHAT'S INSIDE

BACKGROUND

Diabetes in pregnancy, whether gestational diabetes (GDM) or pre-pregnancy diabetes, requires special obstetrical care and has long-term health implications for the mother and child. Previous studies in the past decade have found that approximately 2-5% of pregnancies are complicated by diabetes.[1] The prevalence of diabetes in pregnancy in these studies ranged from 1 to 14%, depending on the population studied. Few recent population-based studies, however, have examined trends in diabetes in pregnancy, particularly among American Indians.

Because of the public health implications of maternal diabetes, many state health departments have modified birth certificates to allow the recorder to indicate whether the pregnancy was complicated by GDM (diabetes diagnosed during the pregnancy) or diabetes that was diagnosed prior to the mother becoming pregnant (pre-pregnancy diabetes). The obstetrical concerns are slightly different between the two forms of diabetes, but the long-term public health consequences of exposure to diabetes in utero for the offspring appear to be similar. Recent studies have documented that children exposed to diabetes in utero are more likely to become overweight and to develop diabetes at a young age compared to children who were not

exposed.[2,3] In addition, GDM is an important risk factor for the subsequent development of type 2 diabetes for the mother.[4] Several studies, however, have documented effective strategies to prevent diabetes in women with a history of GDM.[5,6]

This report describes trends in any diabetes in pregnancy in American Indian and white mothers in Montana from 1989 to 2000.

METHODS:

Birth records from Montana vital statistics for the years 1989 to 2000 were utilized for this study. Births to Montana residents were included whether or not women were actually delivered in or out of the state. Births to women who delivered in state but were not Montana residents were excluded. In addition, we excluded a small number of births among state residents whose race was not categorized as American Indian or white (1%).

Montana birth certificates included a check box to indicate the presence of diabetes from 1989 through 1996, and in 1997, two check boxes were included to indicate the presence of GDM or non-gestational diabetes. Data for the two time periods were compared to assess trends in any diabetes in pregnancy: the beginning of the decade (1989-1991) and the end of the decade (1998-2000).

Data analyses were conducted using SPSS software (Chicago, Il.). Birth records were grouped into four three-year time periods to assess trends in the rate per 1,000 live births of any diabetes in pregnancy in American Indian and white Montana mothers. The proportion of pregnancies with GDM or pre-pregnancy diabetes in American Indian and white women were also estimated in 2000. Chi Square tests for linear trends were used to identify statistically significant differences in the rate of any diabetes in pregnancy.

RESULTS:

From 1989 through 2000, 133,991 births to Montana women were recorded. Overall, the total annual number of live births in Montana a decreased slightly from the beginning to the end of the decade (Table 1). The majority of Montana mothers were classified as white (87%) or American Indian (11%). There were no differences in the mean age of Montana women with a live birth from 1989 to 1991 (mean age 26.6 years, 95% CI 26.5-26.6) compared to 1998 to 2000 (mean age 26.7 years, 95 % CI 26.6-26.7). The total number of births with any diabetes in pregnancy recorded increased for American Indian and white women from the beginning to the end of the decade in Montana (Table 1).

In Montana, the rate of any diabetes in pregnancy was significantly higher among Indian mothers compared to white mothers both at the beginning of the decade (31/1,000 live births in American Indians; 18/1,000 live births in whites, $p < 0.001$) and at the end of the decade 41 to 26 per 1,000 live births, $p < 0.001$). (Figure 1) The rate per 1,000 live births of any diabetes in pregnancy increased significantly in Montana American Indian mothers ($p = 0.04$) and white mothers ($p < 0.001$) from the beginning to the end of the decade. The rate per 1,000 live births of any diabetes in pregnancy increased significantly in Montana American Indian mothers aged <30 years, in white mothers aged <30 years, and in white mothers aged >30 years (Figure 2).

Table 1. Number of births and the number of births with any diabetes in pregnancy among American Indian and white Montana state residents, 1989-2000.

	TIME PERIOD			
	1989-1991	1992-1994	1995-1997	1998-2000
MONTANA				
Total live births[a]	34,767	33,892	32,816	32,516
American Indian	4,200	3,803	3,638	3,772
White	30,176	29,656	28,705	28,243
NUMBER WITH ANY DIABETES				
American Indian	132	136	122	155
White	532	645	617	742

[a]Total live births among state residents who were either American Indian or white.

Figure 1. Rate per 1,000 live births of any diabetes in pregnancy among American Indian and white mothers, Montana, 1989-2000.

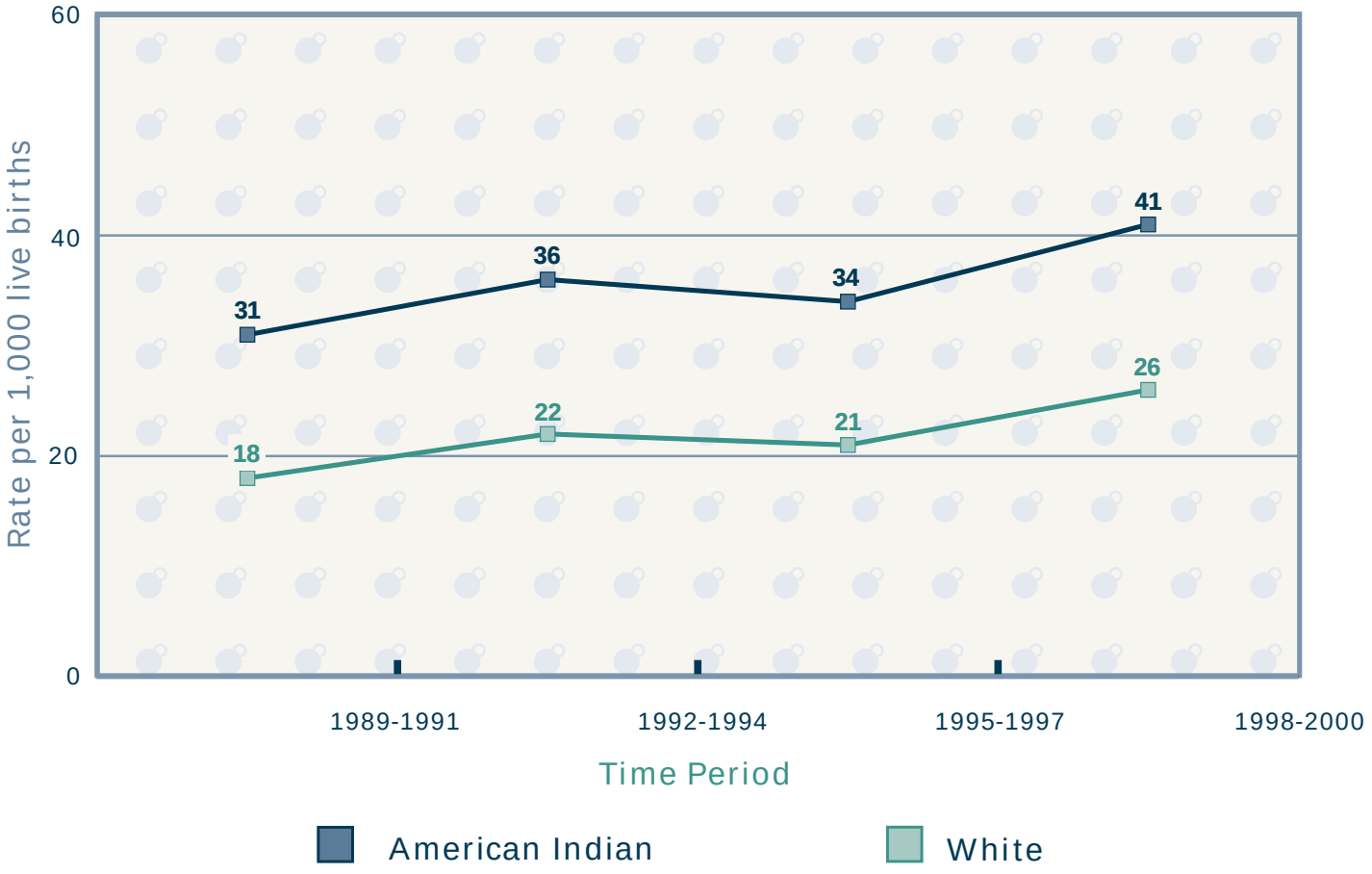
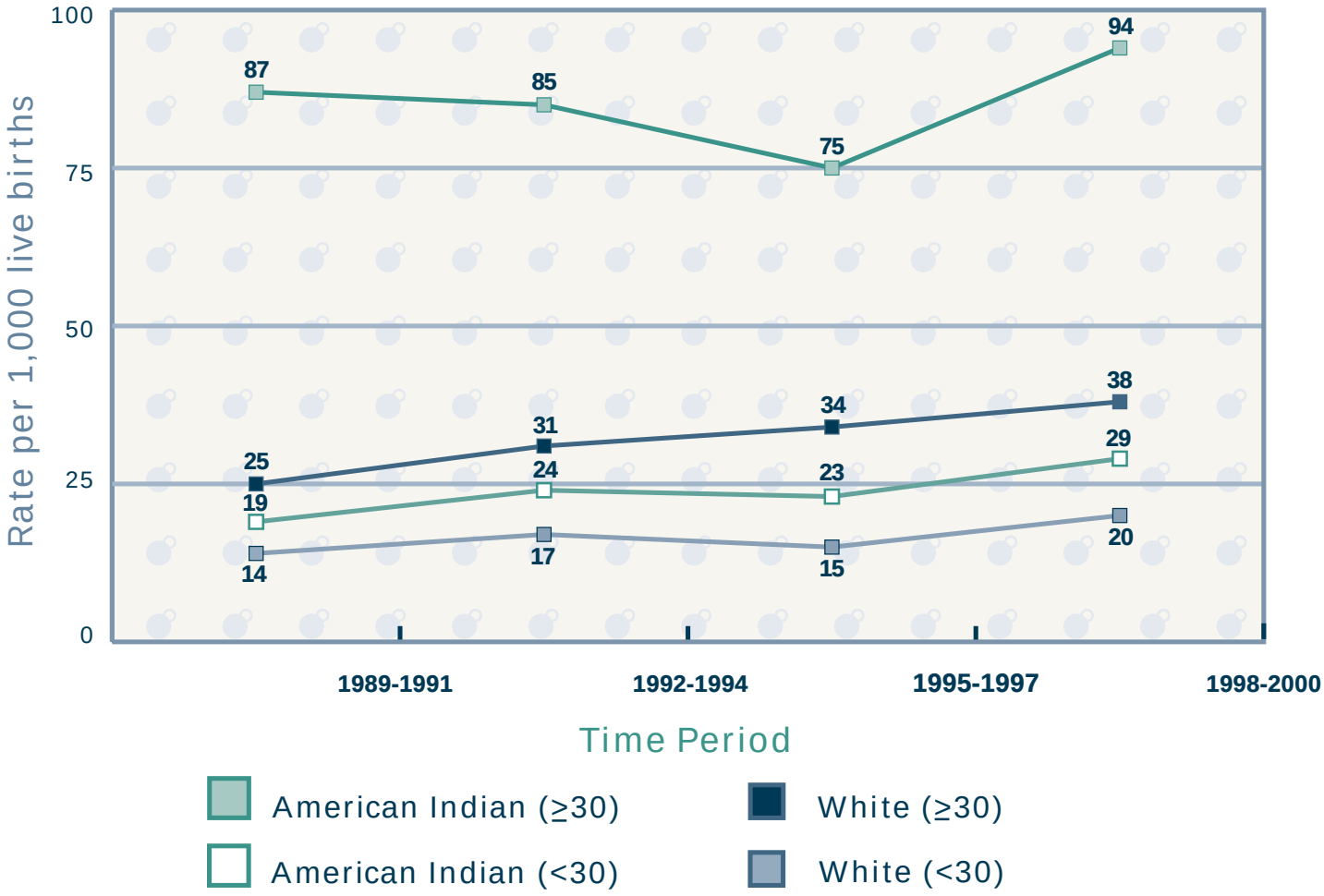


Figure 2. Rate per 1,000 live births of any diabetes in pregnancy among American Indian and white mothers, by age, Montana, 1989-2000.



Overall in 2000, 80% of mothers with diabetes in pregnancy were categorized as having GDM (Table 2). A larger proportion of American Indian mothers (29%) had pre-pregnancy diabetes compared to white mothers (21%).

DISCUSSION:

Montana's birth records document an increase in diabetes in pregnancy in both American Indian and white mothers between 1989 and 2000. It is not yet clear whether the increase has occurred only in GDM (first diagnosed during pregnancy) or in pre-pregnancy diabetes (diagnosed before pregnancy) or in both types of diabetes in pregnancy. Rates of GDM are obviously affected by screening practices, but universal screening has been widely recommended in recent years.[7] Women of childbearing age have become increasingly overweight so that increases in GDM and type 2 diabetes among mothers are not surprising.[8] However, the increasing rates are of concern. Diabetes in the mother prior to conception is associated with a higher rate of congenital malformations compared to women with normal glucose tolerance, and offspring of a mother with GDM and fasting hyperglycemia are also at higher

risk for malformations.[9] Maternal and fetal concerns are slightly different between the two forms of diabetes, but both require meticulous attention throughout the pregnancy to prevent maternal and fetal complications.

> Our findings indicate that the rate of diabetes in pregnancy has increased and progressively more children have been exposed to diabetes in utero.

Several long-term effects of diabetes in pregnancy are emerging as major issues. First, women with a history of GDM are at high risk for developing type 2 diabetes after the pregnancy. The recently published Diabetes Prevention Program (DPP) demonstrated that diabetes could be prevented in women with a history of GDM.[5] The publication of this and other diabetes prevention studies emphasizes the need to screen all women with a history of GDM very carefully after the pregnancy and also to begin lifestyle interventions to prevent diabetes in this high-risk group. Secondly, exposure to diabetes in utero is also associated with serious long-term consequences for the child. American Indian children exposed to diabetes in utero are at much higher risk for the early onset of obesity and type 2 diabetes in youth than their siblings born before the mother developed diabetes.[2] In turn, young women with early onset diabetes are then likely to expose their offspring to diabetes in utero perpetuating what has been termed a "vicious cycle." A recent study in Chicago also found that adolescent offspring of mothers with diabetes were more likely to be overweight than controls who were not exposed to diabetes in utero.[3] The exact mechanism by which the diabetic fetal milieu promotes obesity in childhood and adolescence is not clearly understood, but the serious health consequences of obesity in childhood and adolescence are very well known. The years of potential life lost from obesity are highest for young adults.[10] Thus the potential impact of the increases in diabetes in pregnancy found in both American Indian and white mothers in Montana extends far beyond the immediate perinatal period.

Reported by: D Gohdes, TS Harwell, SD Helgerson, C Oser, MR Spence, Montana DPHHS

Table 2. Proportion of diabetes in pregnancy associated with GDM and pre-pregnancy diabetes among American Indian and white mothers, Montana, 2000.

	AMERICAN INDIAN	WHITE	TOTAL
	n (%)	n (%)	n (%)
GDM	32 (71)	191 (80)	223 (79)
Pre-pregnancy diabetes	13 (29)	48 (20)	61 (21)
Any diabetes in pregnancy	45	239	284

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NEWLY RECOGNIZED DIABETES EDUCATION PROGRAMS

The following list includes those diabetes education programs that have recently achieved recognition from the American Diabetes Association. They have met the high standards for quality required, and deserve our congratulations!

- Diabetes Loving Care Program, Frances Mahon Deaconess Hospital, Glasgow Montana.

UPCOMING CONFERENCES FOR HEALTH PROFESSIONALS & PATIENTS/FAMILIES

APRIL 2003 - The Montana Chapter of the American Association of Diabetes Educations is sponsoring a workshop on April 11, 2003 at the Holiday Inn in Bozeman. Christine Fiore, PhD from the University of Montana Department of Psychology will be presenting on the use of motivational interviewing for health behavior change. Also, Michele Deck, RN, MEd, LCCE, FACCE, a nationally recognized expert on how to teach adults creatively and effectively will be presenting on "getting you and your learners motivated!" Nursing, dietician, and pharmacy continuing education credits will be available. For information on this workshop and a registration brochure please contact Becky Brundin at (406) 293-0175, or via email at lbrundin@libby.org.

OCTOBER 2003 - The annual diabetes conference for health professionals is planned for October 10-11, 2003 at the Heritage Inn in Great Falls, Montana. Continuing education credits will be provided. Save the date for this exciting meeting!!

ADA YOUTH RETREAT

The American Diabetes Association will host its Youth Retreat 2003 from June 19-22, 2003 at Camp Mak-A-Dream. The camp is open to children and teens who will be ages 8-17 years on September 20, 2003. While the primary objective of camp is to provide a safe, fun, traditional camping experience, attention to the medical needs of each camper is always a priority. Each camper has the opportunity to learn and practice valuable diabetes self-management techniques under medical supervision.

Tuition is $350. Funds are available to assist families based on financial need and availability of funds. Application deadline is April 18, 2003. For more information on attending camp please contact the ADA office at 1/800-766-8596 or 406-256-0616.

Volunteer opportunities exist for adults who would like to help with this wonderful camping experience. For more information, contact the ADA office.

UPCOMING EVENTS FOR PERSONS LIVING WITH DIABETES AND THEIR FAMILIES:

NOVEMBER 2003 -The American Diabetes Association will be having their annual Diabetes EXPOs for persons with diabetes and their family members. These events are great opportunities for people with diabetes and their families to learn the latest on diabetes management! The EXPOs will be held in Billings and Missoula in November 2003. Dates and times will be announced soon. For more information visit or call the ADA at 3203 3rd Avenue North, Suite 203, Billings, Montana 59101, 1-800-766-8596 or (406) 256-0616.

WHAT IS THE MONTANA DIABETES PROJECT AND HOW CAN WE BE CONTACTED:

The Montana Diabetes Project is funded through a cooperative agreement with the Centers for Disease Control and Prevention, Division of Diabetes Translation (U32/CCU815663-05). The mission of the Diabetes Project is to reduce the burden of diabetes and its complications among Montanans. Our web page can be accessed at http://ahec.msu.montana.edu/diabetes/default.htm.

For further information please contact us at:

Project Coordinator:
Todd Harwell, MPH
Phone 406/444-1437
Fax 406/444-7465
e-mail tharwell@state.mt.us

Education Coordinator:
Marcene Butcher, RD, CDE
Phone 406/444-6677
e-mail marcibutcher@msn.com

Cardiovascular and Diabetes Epidemiologist
Carie Oser, MPH
406-444-4002
e-mail coser@state.mt.us

Quality Improvement Coordinator:
Janet McDowall, RN
Phone 406/248-1270
e-mail jmcdowall@state.mt.us

Project Assistant:
Susan Day
Phone 406/444-6677
e-mail sday@state.mt.us

Quality Improvement Coordinator:
Jeanine Ford, RN, BA
Phone 406/444-0593
e-mail jford@state.mt.us

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